Aldosterone secretion in severe renal failure
A method is described for determining the rate of secretion of aldosterone in persons with poor renal function and delayed excretion of metabolites. The method enables estimates to be made of the relative proportions of aldosterone metabolites eliminated in the faeces and the urine.
In 12 patients with blood urea concentrations above 80 mg per 100 ml the estimated mean faecal excretion of aldosterone metabolites has been 17.4% in the first day, compared with a mean of 21.8% in a group of 24 patients with blood urea below 50 mg.
The aldosterone secretion rate in the uraemic subjects has varied from 66 to 910 µg per day, the mean for the series being 292 µg per day. The mean secretion rate in ten normal subjects was 129 µg.
The mean daily excretion of tetrahydro aldosterone in the urine has been 32.8 µg in the group with nitrogen retention, compared with a mean of 26.6 µg in a group of 24 subjects with blood urea below 50 mg per 100 ml.
The aldosterone secretion rate in uraemia does not show any correlation with the blood urea level, with the urinary sodium or potassium excretion, or with the concentration of either sodium or potassium in the serum.
The significance of the results is discussed.
Author’s address: Dr. C.L. Cope, Dept. of Medicine, Postgraduate Medical School of London, Ducane Road, London, W 12 (England).
Magnesium content of serum and erythrocytes in renal insufficiency. Serum- und Erythrozyten-Magnesium bei renaler Insuffizienz
From 11 patients with acute renal insufficiency (no disease lasting longer than 8 days) and from 14 patients with chronic renal insufficiency, magnesium content of serum and red blood cells (ammonium phosphate method) as well as serum concentrations of nonprotein nitrogen, bicarbonate, anorganic phosphates and sulfates have been determined. In both groups of patients normal and elevated serum magnesium values were found (Fig. 1). A relation between serum magnesium and nonprotein nitrogen values was not existing. The magnesium content of erythrocytes was found normal by renal insufficiency, whereas it was increased by chronic renal insufficiency (Fig. 2). Former experimental results (1, 2) could be confirmed, whereby in cases of chronic renal insufficiency existed a negative correlation between serum bicarbonate and magnesium content of erythrocytes and a positive correlation between nonprotein nitrogen of serum and red blood cell magnesium. Beyond that, however, positive correlations between magnesium content of erythrocytes and anorganic phosphates in serum as well as magnesium content of erythrocytes and anorganic sulfates in serum were found from patients with chronic renal insufficiency. Considering the totally undissociated behaviour of magnesium content in Fig. 1
Fig. 2
Fig. 1 and 2. Magnesium content of serum and red blood cells from patients with acute (o) and with chronic (+) renal insufficiency.

Magnesium cannot be due to renal retention of magnesium ions. The correlations observed relations make it probable, that the developed increase of red blood cell magnesium from patients with renal insufficiency originates in the uremic disorder of the metabolism on the red blood cells. The temporal criterion, which were found in both groups of patients as well as in the course of disease of each individual patient, point out, that these effects do not touch peripheral erythrocytes, but affect the red cells whilst being in formation and maturation within the bone marrow.

References
Authors’ address: Dr. S. Hänze and W. Hiller, I. Med. Klinik, Mawé (Germany).

The pathogenic role of fibrin deposition in the glomerular lesions of toxemia of pregnancy
An immunofluorescent study of renal biopsies from patients with toxemia of pregnancy has been performed. It was found that the glomeruli consistently showed

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bright staining with fluorescent antifibrinogen serum; the staining was present within endothelial cells as well as occasionally along the basement membrane. Gamma globulin was only occasionally demonstrable, in the form of irregular deposits along the basement membranes. Complement was absent and albumin was not seen in glomeruli, except sometimes in the form of droplets within epithelial cells.
In biopsies from pregnant patients without toxemia, no significant staining for any of these materials was seen.
The inconstant presence of gamma globulin and the absence of complement in toxemic glomeruli seem to rule out the possibility of an immunological basis for the renal lesions of toxemia. It is proposed that the positive staining with anti-fibrinogen serum indicates the presence, within and between endothelial cells, of material derived from fibrinogen, formed during a slow state of intravascular coagulation. It is suggested that the arrest in glomeruli and the phagocytosis by glomerular cells of some form of circulating fibrin constitutes the basic pathogenic mechanism of the glomerular damage in toxemia. Support for this concept was provided by experiments in which induction of a state of intravascular coagulation in rabbits resulted in ultrastructural glomerular changes very similar to those of toxemia (1). It was shown that these changes were the result of deposition and phagocytosis by endothelial cells of fibrin and other materials derived from fibrinogen.

Reference

Author’s address: Dr. Pierre Vassalli, Dept. of Pathology, New York University Medical Center, 550 First Avenue, New York, N.Y. (USA).
Renal papillary necrosis. A clinical survey of sixty-six cases
Renal papillary necrosis has earlier been known as a complication of pyelonephritis in diabetics and in patients with obstruction of the urinary tract. In a series of 66 cases of r.p.n. admitted to a department of internal medicine during the years 1957-1960 only 12 had either diabetes or urinary obstruction, whereas the remaining 54 were assumed to be cases of 'chronic interstitial nephritis' caused by abuse of analgesics. Characteristic of this group was the paucity of symptoms. Half of the patients had recurrent attacks of acute febrile pyelonephritis, often accompanied by voiding of lumps of necrotic papillary tissue, but in the other half the development of the kidney disease was totally silent and the presenting symptoms were those of renal failure. Less than half of the patients with histologically verified r.p.n. had a characteristic roentgenogram, in the rest the X-ray examination was noncontributory. The nephropathy was characterized by polyuria, minor albuminuria and normal blood pressure. Most of the patients, but not all, had evidence of urinary tract infection. As a rule progression was very slow, lasting for years.

A total of 37 patients had died during the period of observation, 11 from progressive uremia, 14 from septic exacerbation of the urinary tract infection. In 5 patients death was due to severe extrarenal disorders complicated by necrosis of all the renal papillae, probably because of renal anoxia.

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Antibiotic treatment is of importance both during the acute exacerbations of urinary tract infection and as long-term treatment. Replacement treatment in form of blood transfusions and administration of bicarbonate or other salts is often indicated. Termination of the abuse of analgesics, when present, seems to be a condition of therapeutic success.

Author’s address: Dr. B. Harvald, Bispebjerg Hospital, Afdeling C, Copenhagen (Denmark).

Etude au microscope électronique de six cas d’amylose rénale humaine
L’étude de la structure fine de 6 cas d’amyloses rénales humaines a été particulièrement orientée: a) sur les aspects de la membrane basale aux différents stades, b) sur l’aspect des espaces intercapillaires aux stades précoces. Les faits morpholo-giques suivants ont pu ainsi être établis:

La substance amyloïde semble avoir d’emblée une structure fibrillaire. Lorsque les parois des anses capillaires périphériques sont épaissies par un depot amyloïde volumineux, le ruban hyalin de la membrane basale primitive per-siste mais sa structure est altérée par la présence de multiples fibrilles amyloïdes.

Par contre, aux stades initiaux, les fibrilles amyloïdes ne se voient pas au sein de la «lamina densa» de la membrane basale, mais apparaissent exclusivement sur les deux versants clairs epithelial et endothélial de la membrane. Cet aspect suggère que l’amylose pourrait représenter un depot anormal d’origine extrinsèque, plutôt qu’une transformation in situ de la membrane basale.

Dans les stades très précoces de l’infiltration amyloïde du glomérule, la substance fibrillaire se trouve tout d’abord dans les espaces intercapillaires, elle n’atteint que plus tardivement les parois capillaires périphériques. Cette localisation prioritaire de la substance amyloïde mérite, elle aussi, d’être prise en consideration dans l’analyse physio-pathologique du processus amyloïde. Les alterations des cellules endothéliales sont modérées à types de ballon-nement et d’hypertrophie segmentaire de la lame cytoplasmique endothéliale. Les lesions épithéliales sont plus profondes avec reduction progressive du cytoplasme par la substance amyloïde. A aucun
stade évolutif du processus amyloïde il n’a pu être mis en evidence de fibrilles amylotiques intracellulaires.

De petits dépots de fibrine à structure périodique caractéristique existent en abondance variable dans la lumière de certaines anses capillaires. Ils sont présents sur toutes les biopsies examinées. Adresse de l’auteur: Dr. N. Hinglais, Clinique des Maladies Métaboliques, Hôpital Necker, 149, rue de Sevres, Paris XVe (France).

Le rein du saturnisme chronique

L’étude de huit malades indiscutablement frappés de saturnisme chronique montre la fréquence de l’atteinte rénale. La protéinurie et les modifications du sediment urinaire ne sont constatées que dans deux cas sur huit, correspondant aux malades porteurs de lesions glomérulaires profondes. L’hypertension artérielle, permanente

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ou révélée lors de l’immersion d’un bras dans l’eau froide, s’observe six fois. Dans tous ces cas, l’examen anatomique décèle des lesions artérielles ou artériolaires.

La fonction rénale est globalement diminuée lorsqu’il existe une atteinte anatomique severe, glomérulaire ou interstitielle et vasculaire. Une dissociation entre la clearance de la créatinine et la clearance de l’urée, souvent nettement diminuée, a été presque constamment notée. De même l’excrétion de l’acide urique semble électivement troublée, ce qui doit être rapproché du fait que trois de ces huit saturnins sont atteints de goutte.

Les lesions observées en microscopie optique ne sont nullement spécifiques. Par contre, dans trois cas sur quatre, il a été constaté en microscopie électronique des lesions tubulaires caractéristiques, comparables à celles observées au cours du saturnisme chronique expérimental. Ces faits permettent d’affirmer l’existence d’une néphropathie chronique d’origine saturnine, identifiable même après des années d’évolution. Ils permettent peut-être de rattacher au saturnisme certaines maladies de Bright.

L’intérêt de poursuivre le traitement par l’E.D.T.A. est souligné.

Adresse de l’auteur: Dr. G. Richet, Service de Néphrologie de l’Hôpital Tenon, Paris (France).

Quantitative approach to the I131 renogram

Radioactive isotope renography has been a useful clinical procedure but, with only qualitative interpretation of the renogram, it is subject to diagnostic error. A statistical analysis of an approach to quantitation using the criteria of $T_T/2$ has been performed. With upper limits of normal set at 4 min and 7 min, respectively, for these criteria, 2 of 22 normal subjects showed false-positive results and 18 of 114 patients with proved renal disease had false-negative results. The analysis indicated that this simple and rapid quantitative approach led to a reasonable degree of accuracy.

Author’s address: Dr. Frank A. Brown, The Radiation Therapy Center, 1215, 28th Street, Sacramento, Calif. (USA).

Wegener’s granulomatosis. A clinico-pathologic study of four cases

This is a report of 4 fatal cases of Wegener’s granulomatosis, each with autopsy findings. This rare disease is characterized by necrotizing granulomatous respiratory tract lesions, disseminated
arteritis, and glomerulonephritis. Other features are fever, purpuric bullous skin lesions, arthritis and episcleritis. One of these 4 patients developed Mikulicz’s syndrome which on biopsy proved to be caused by chronic suppurative adenitis. Another, who was in a near terminal state with renal failure and uremia had a dramatic response to adrenal steroid treatment but subsequently developed the nephrotic syndrome and died in uremia 3 years after the onset of his illness. Synovial biopsy revealed chronic inflammatory changes similar to those of rheumatoid arthritis in a patient in whom arthritis was prominent.

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Diffuse and focal glomerulonephritis and arteritis were found in the kidneys. Necrotizing renal papillitis was noted at autopsy in 2 patients. Necrotizing lesions and arteritis were found in lungs, heart, spleen, paranasal sinuses, nasal mucosa, and other organs. Treatment proved unsatisfactory but high doses of adrenal steroids seemed helpful, especially when renal involvement was present. Terminal renal failure was rapid and unremitting in 3 of the 4 patients. The etiology is unknown but the disease appears to be related to other conditions associated with vascular hypertensitivity, particularly periarteritis nodosa.

Author’s address: Dr. David A. Berman, Department of Medicine, Veterans Administration Hospital, Minneapolis, Minn. (USA).

Alterations of the juxta glomerular apparatus of human kidneys in some forms of hypertensive disease and renal hypertension


Variations of juxta glomerular apparatus were studied in chronic glomerulonephritis or pyelonephritis with severe hypertension, unilateral thrombosis of the renal artery and scleroderma with kidney involvement. In the majority of cases hypertrophy and hyperplasia of the juxta glomerular apparatus was observed with a marked accumulation of granules. In kidneys of healthy persons and in cases of benign hypertension the J.G.I, according to Hartroft varied within 2.3-7.2, while in the above-mentioned affections it reached the level 39.3-101.9. A distinct correlation between the values of J.G.I, and the renin content determined by direct and indirect methods was observed. In the majority of cases with only one exception a high J.G.I, was correlated with an increase of the renin activity in kidney homogenates; in cases of low J.G.I, no increase of the renin activity was noticed.

Author’s address: Prof. A. M. Vikhert, Institute of Therapy, Academy of Medical Sciences USSR, Petrovskiy, per. io, Moscow (USSR).

Fibromuscular hyperplasia of renal arteries in hypertension


Morphologic features in renal arteries of nineteen patients with hypertension have been described. The patients were selected on the basis of radiologically demonstrable narrowing of one or both renal arteries and absence of gross or microscopic evidence of renal artery arteriosclerosis. Two distinct morphologic patterns predominated. In the first pattern (Group I) ridges of proliferating smooth muscle and fibrous tissue within the media alternated with thin walled, aneurysm-like out-pouchings. These irregularly spaced zones of concentric mural thickening resulted in narrowing of the lumen at the point of maximal thickening. In many instances the areas of thickening formed ridges or trabeculae at right angles to the long axis of the artery, producing a corrugated appearance when viewed from the intimal aspect. In most instances the abnormality of the vessel wall began a short distance distal to the ostium of the renal artery, and did not extend beyond the bifurcation. In three patients berry aneurysms up to 6
mm in diameter were present. The intima was normal in most areas, but occasionally a minimal proliferation of fibrous tissue was present in this layer. Many arteries had prominent bundles of smooth muscle arranged along the longitudinal axis within the adventitia.

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In the second (Group II), a concentric rim of fibrous tissue replaced the outer portion of the media. Two patients showed evidence of both patterns in the same artery. In both groups narrowing of the lumen was present to a striking degree. The diseased arteries showed no consistent alterations in elastic tissue and only slight increases in the mucopolysaccharides within the media. No evidence of current or old inflammation was found.

Author’s address: Dr. J.S. Wellington, Department of Pathology of the University of California Medical Center, San Francisco, Calif. (USA).

Removal of bacteria from fluid path of Skeggs-Leonards-Heisler artificial kidney by continuous millipore filtration


Insertion of Millipore filter (YY30 293 02 holder with type GS or HA filter1) into the fluid path of a modified Skeggs-Leonards-Heisler artificial kidney permitted removal of particles larger than 0.22 micron (Type GS) or 0.45 micron (Type HA) from dialyzing solutions circulating at our customary flow rates of 1 to 1.51 per min. Unfiltered dialyzing solutions contained appreciable bacterial populations which increased with time during dialysis. Filtered solutions entering the dialyzers were bacteriologically sterile with few exceptions. Experimental and clinical procedures confirmed the efficacy of this filtration. Use of the filter is mechanically simple and does not otherwise alter the operation and efficiency of the apparatus.

1 Millipore Corporation, Mass. (USA). Author’s address: Dr. F.T. Maher, Mayo Clinic and Mayo Foundation, Rochester, Minn. (USA).

Changes in acid-base balance during and after treatment with extracorporeal dialysis. – Änderungen des Säure-Basen-Zustandes während und nach Behandlung mit der extrakorporalen Dialyse


The acid-base changes which occurred in seven patients during eleven extracorporeal dialyses were studied. Five of these patients had acute renal failure, two had chronic nephritis. To evaluate the acid-base status in the arterial blood, the actual pH-value, the carbon dioxide partial pressure (pCG⅛), the standard and actual bicarbonate, buffer-base and base-excess were determined.

The primary disturbance in acid-base balance was a metabolic, partly de-compensated acidosis, which was present at the beginning of many dialyses. This was markedly improved by the dialysis, mainly due to an increase in the bicarbonate level. In spite of the rapid elevation of the actual pH-value there was no remarkable change in acidotic-breathing, as shown by the lowered arterial pCG⅛ (sign of respiratory compensation), which seemed not to vary significantly, though there was no CO2-I0SS by the membranes of the artificial kidney. This suggests the influence of intracellular acid-base status on respiratory control in acidotic conditions. At the end of the dialyses, the acid-base status was characterized by a respiratory alkalosis, due to the increased bicarbonate concentration and lowered pCG⅛. In conclusion, the acidotic condition is remaining over a long period in the cerebral

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respiratory center while in blood and other tissues alkalosis is developing by dialysis and over-
respiration.
Authors’ address: Dr. H. Sartorms and H. Laemperle, Med. Univ. Pol·iklinik, Freiburg i. Br. (Deutschland).
Development and use of an arteriovenous shunt in acute renal failure treated by haemodialysis
This unit has employed an arteriovenous shunt in acute cases of renal failure since June 1961.
Various models have been developed over this period and this has greatly facilitated the ease of
dialysis in these patients.
The original models have been described in the Australian and New Zealand Journal of Surgery
(1963). The first model consisted of the connection of two polyvinyl-chloride catheters
connected together by means of a separate by-pass component. The connections were crude and
were secured in position by wire strands. The next model was more sophisticated and consisted
of a supporting plate which was strapped to the forearm. On this plate a vertical column which
contained two connecting rods was situated. The catheters were connected to the one end of the
connecting rod and a separate by-pass component to the other end. These ends were secured
together by specially designed screw-on type junctions. This model therefore had five tubular
components (two vessel cannulae; two connecting rods; a by-pass shunt and four junctions). This
was simplified as follows: (1) The supporting plate was discarded as it was unsatisfactory. (2)
The two connecting rods were dispensed with and the vessel cannulae were connected directly to
the by-pass component. There were thus only two junctions and three tubular components. The
detailed construction and use of this particular model which was constructed in teflon was
described in the Lancet (1962).
However, the use of teflon was associated with certain disadvantages because of its rigidity. This
model was further simplified by connecting the arterial catheter directly to the venous one. In
order to do this a plastic that was malleable had to be used and polyvinyl-chloride tapered
catheters were substituted for teflon. This only required a single junction which was further
simplified in that a push-in type was employed rather than a screw type which resulted in clot
formation. The push-in type of junction was maintained in position by a specially designed cli-
pton spring. This has been described in the British Medical Journal (1963). A specially constructed
apparatus was designed in order to construct this right angle flange in a mechanically perfect
manner.
This shunt is specifically designed to be tailored to the specific requirements of each individual
patient and accordingly the internal diameter of each vessel is measured by means of a special
vessel and tapered poly vinyl catheters are employed whose size range from a No. 4 to a No. 14
French. The youngest age in which an arteriovenous shunt has been employed in our practice is
that of an 8 months old infant.
References
The development of an arteriovenous shunt in facilitating multiple dialyses in
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Author’s address: Dr. J. Nayman, Dpt. of Surgery, University of Melbourne, Alfred Hospital, Melbourne (Australia).

Parabiotic dialysis (La dialyse parabiotique)


La dialyse parabiotique (ou dialyse croisée) est une modification de l'hémodialyse extracorporelle, où la solution de lavage est remplacée par le sang circulant d’un animal vivant. Les échanges ont lieu à travers une membrane de cellophane qui empêche le passage des globules sanguins et des grosses molécules antigéniques. Le but de cette technique est celui d’utiliser la fonction des reins, du foie et d’autres organes de l'animal sain pour corriger les alterations biochimiques du sujet malade. La parabiose dialytique a été employée chez des animaux de la même espèce ou d'espèce différente (chien-chèvre, homme-chien, homme-mouton).

Les expériences faites par les auteurs ont permis de conclure que, dans les conditions employées, la dialyse parabiotique est bien tolérée tant par le donneur que par le receveur. La dialyse de l'urée, de l’eau tritiée et du chlore est à peu près la même qu’avec la technique habituelle de dialyse. Pour l’application clinique, toutefois, le gradient de concentration de l’urée étant moins élevé, la dialyse parabiotique est moins efficace. Mais elle a l’avantage de permettre la régulation auto-matique de l’équilibre électrolytique et d’autres équilibres biochimiques, sans danger d’hypercorrection. Les possibilités de correction ne sont pas limitées comme dans les méthodes de dialyse traditionnelles par la composition simplifiée du liquide de dialyse. Contrariées aussi à ce que l’on observe dans les méthodes conventionnelles (surtout dans le cas de dialyses répétées et prolongées), il n’y a aucune perte de substances utiles. On sait déjà, en effet, que les vitamines et les acides aminés sont dialysables. Dans les expériences rapportées, on a pu mettre en évidence que l’adrénaline, la noradrénaline, l’angiotensine, l’hormone anti-diurétique, l’hormone lutéinisante, l’hydrocortison, l’insuline et, probablement, l’érythropoïétine sont capables de passer à travers la membrane. Dans une expérience unique d’anaphylaxie, on a obtenu des résultats qui font penser que certains composés antigéniques sont dialysables. Enfin, après ligature du cholédoque chez le chien, la bilirubinémie baisse bien plus rapidement pendant la dialyse parabiotique que pendant la dialyse conventionnelle: la bilirubine et d’autres substances toxiques liées aux protéines plasmatiques peuvent probablement être extraites avec plus d’efficacité par un liquide de dialyse riche en protéines tel que le sang.

La dialyse parabiotique serait probablement utile dans le traitement du coma hépatique, de certaines intoxications et de certains types d’hypertension.

Adresse des auteurs: Dr. M. Pavone-Macaluso, R.W. Alexander, R. B. Geering et P.M. Galletti, Department of Physiology, Emory University, Atlanta, Ga. (USA).

Monitoring haemodialysis by a means of rapid blood-urea estimation


The duration of haemodialysis is determined by plotting the fall of blood urea during a dialysis. The pattern of this fall is that of a first order logarithmic reaction

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and has two components–namely an initial sharp decline followed by a flattening of the curve. Excluding the specific factors which necessitate early termination of dialysis it has been our
practice to terminate dialysis when the flattened component of this curve became evident. In
absolute values this is equivalent to a blood urea fall not exceeding 0.25 mg per 100 ml per min.
The plotting of this curve requires frequent estimations of change in blood urea level. Blood
samples are taken at hourly intervals in the early period of haemo-dialysis and later at half hour
and finally at quarter hour intervals, according to the rate of fall of urea.
A technique is therefore necessary that would comply with the following criteria: (1) Time of
estimation should not exceed 15 min. (2) Accuracy should compare favourably with other
methods. (3) Method should be simple to perform. The method developed is a modification of
the Hench-Aldrich test. Five ml of heparinized blood is used and the protein removed by adding
10% trichloracetic acetic acid. This is centrifuged and 5 ml of the protein free supernatant fluid is
titrated with 5% mercuric chloride until a drop of the mixture when added to a drop of saturated
potassium carbonate on a white spot turns ‘rust brown’ within three seconds. There is a direct
relationship between the mercury combining power and the blood urea. In a comparison of the
duration of dialysis for the 12 month period July 1960 to June 1961 when this technique was not
used with a 12 month month period July 1961 to June 1962 the average duration of dialysis has
decreased from 7.3 h in 40 dialyses to 5.2 h in 65 dialyses.
Author’s address: Dr. J. Nayman, Dept. of Surgery, University of Melbourne, Alfred Hospital,
Melbourne (Australia).
Successful reimplantation of 24 h stored kidney to nephrectomized dog
By Humphries, A.L.
Most human cadaver kidney transplants have had to be immersed in or infused with, cold
solutions, and then rushed usually within 1 to 4 hours to the hastily prepared recipient. If
kidneys could be protected better against ischemia they could be transplanted more deliberately
into more adequately prepared recipients.
Our first 63 experiments with 24 h storage were encouraging (1). Three canine kidneys, perfused
at 4 to 14° C under 33 mm Hg pressure with oxygenated, diluted serum or plasma, and
reimplanted (contralateral nephrectomy 3 weeks later) still maintain life now 2 years later. The
blood urea nitrogen levels have been constant at about 50 mg per 100 ml since reimplantation,
and the mean blood pressures, 125 to 155 mm Hg.
Our next method was more rewarding (2). It included the use of autologous blood in the
perfusate, a slightly higher perfusion pressure, a membrane lung, and a glass wool filter. Five of
the 7 kidneys (contralateral nephrectomy 3 weeks later) maintain life now 5 to 7 months later.
In the present study (3), immediate contralateral nephrectomy was used. The storage method was
not changed except that homologous, rather than autologous, blood was used in the perfusate.
Eight of the 11 dogs are now well 1 to 6 months later.
The entire perfusion apparatus was housed in a walk-in refrigerator at 10° C (Fig.). A filter of
pyrex glass wool was used. All other surfaces were Teflon or (disposable) polyvinyl sterilized
with 10% formalin. The perfusate pump was a Cutter1 blood infusion pump set to provide a
‘systolic’ pressure of 50 to 60 mm Hg for 13 min to ‘core cool’ quickly and thereafter, a pressure
of 40 to 50 mm Hg. The pump, mechanically squeezed by a lever, gave calibrated flows of 3 to
28 ml/min.
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The lung was of a Clowes type with 0.25 square meters of ½ mil Teflon membrane and was supplied with 2.5% CO2 in O2. The perfusate consisted of 150 ml of fresh homologous blood with 3000 units sodium heparin and 150 ml balanced salt solution (BSS) with 44.6 meq sodium bicarbonate per liter. During perfusion the kidneys excreted various amounts of urine, and excreted it more rapidly during the last hours.

Group A. Seven experiments, the procedure was as described. Four kidneys now maintain near normal blood urea nitrogen levels. Only two clear creatinine and PAH normally. The three failures were due to technical difficulties.

Group B. In 4 experiments, the perfusion was preceded by infusion of 500 ml of BSS (10° C) at 50 mm Hg pressure (30 to 60 min required). The four kidneys now maintain life but with blood urea nitrogen levels of about 40 mg/l00 ml.

References
1 Cutter Anesthesia Saftipump, Cutter Laboratories, Berkeley, Calif.
2 TIS-U-SOL kindly supplied by Baxter Laboratories, Inc., Morton Grove, Ill.
This is essentially Hanks’ BSS without calcium chloride.

Author’s address: Arthur L. Humphries, Department of Surgery, Eugene Talmadge Memorial Hospital, Medical College of Georgia, Augusta, Ga. (USA).
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